



IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant : V. T. Rajan

Serial No. : 10/073,608

Filed : 02/11/2002

Title : Characterization of Objects of a Computer Program While Running Same

Art Unit : 2121

Examiner : Sergey Datskovskiy

Mail Stop Appeal Brief - Patents

Commissioner for Patents

P.O. Box 1450

Alexandria, VA 22313-1450

BRIEF ON APPEAL

(1) Real Party in Interest

International Business Machines Corporation.

(2) Related Appeals and Interferences

None known.

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(3) Status of Claims

Claims 1-10 are pending in the case. (See Appendix of Claims.) Claims 1-10 were rejected under 35 U.S.C. §101 as directed to non-statutory subject matter. Claims 1-10 were rejected under 35 U.S.C. §102(e) as having been anticipated by *Clawson* (U.S. Patent 6,112,304). All of the pending claims are being appealed.

(4) Status of Amendments

On August 3, 2006 Appellant filed an amendment after final rejection attempting to correct some minor matters of form but the Examiner did not enter the amendment.

(5) Summary of Claimed Subject Matter

Claim 1

A method characterizes objects that are generated during at least a partial run of a program [specification, page 2, lines 21-22]. Each object is characterized by a plurality of alternative properties [specification, page 3, lines 1-2], such as string representations or data structures which can be selected [specification, page 3, line 10]. A correlation between the desirable property and the characterization information for each of the objects is determined [specification, page 3, lines 11-12]. The correlation is used to select a property for an object subsequently created during an at least partial run of said program based upon characterization information about the subsequently created object [specification, page 3, lines 13-15].

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Claim 2

Claim 2 recites that the determining of the initial (a desirable) property is carried out by minimizing total cost of interaction among components during at least a partial run of the program [specification, page 3, lines 16-18].

Claim 3

Claim 3 recites that characterization information of an object comprises at least one of said object's class, classification of said object's creator object, and a code identification of said object's creation site [specification page 7, line 21 –page 8, line 2].

Claim 4

Claim 4 recites alternative properties comprising a string representation selected from ASCII, EBCDIC, and UNICODE [specification page 3, lines 2-3].

Claim 5

Claim 5 recites that alternative properties comprise a data structure selected from hash table, tree, and compressed data structures [specification page 3, line 3].

Claim 6

Claim 6 recites a computer readable medium [specification page 13, lines 18-21] including computer instructions executable on a computer for carrying out a method of characterizing objects generated during at least a partial run of a program, each object being characterized by a plurality of alternative properties which can be selected [specification, page 3, lines 1-2], said method comprising: a) instrumenting said at least partial run of said program to determine characterization information about each of said objects [page 3, lines 5-9]; b) determining a desirable property for each of said objects [page 3, line 10]; c) determining a

correlation between said desirable property and said characterization information for each of said objects [page 3, lines 11-12]; d) using said correlation to select an property for an object subsequently created during an at least partial run of said program based upon characterization information about the subsequently created object [page 3, lines 13-15].

Claims 6-10 are dependent on claim 5 and are patentable for the same reasons as their counterpart method claims and thus stand or fall together.

(6) Grounds of Rejection to be reviewed on Appeal

The grounds of rejection to be reviewed on appeal are:

1. Did the Examiner properly reject claims 1-10 under 35 U.S.C. §101 as being directed to non-statutory subject matter?
2. Did the Examiner properly reject claims 2 and 7 under 35 U.S.C. §112 as being indefinite?
3. Did the Examiner properly reject claims 1-10 under 35 U.S.C. §102(e) as having been anticipated by *Clawson* (U.S. Patent 6,112,304)?

(7) Argument

(a) Section 101: Statutory Subject Matter.

The first step on the road to obtaining a patent for an invention is to establish that the invention falls within one of the categories enumerated by statute for which a patent may be

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obtained. The patent statute enumerates several classes of inventions that may be patented.

Section 101 provides that:

"Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title."

The United States Court of Appeals for the Federal Circuit has noted that the repetitive use of the expansive term "any" in § 101 shows Congress's intent not to place any restrictions on the subject matter for which a patent may be obtained beyond those specifically recited in § 101. *State Street Bank & Trust Co. v. Signature Fin. Group*, 149 F.3d 1368, 47 USPQ2d 1596 (Fed. Cir. 1998), cert. denied, --- U.S. ---, 119 S. Ct. 851 (1999). Moreover, the Supreme Court has acknowledged that Congress intended § 101 to extend to "anything under the sun that is made by man." *Diamond v. Chakrabarty*, 447 U.S. 303, 309 (1980); *see also Diamond v. Diehr*, 450 U.S. 175, 182 (1981). Thus, it is improper to read limitations into § 101 on the subject matter that may be patented where the legislative history indicates that Congress clearly did not intend such limitations. *See Chakrabarty*, 447 U.S. at 308 ("The Federal Circuit has also cautioned that courts 'should not read into the patent laws limitations and conditions which the legislature has not expressed.'" (citations omitted)). *State Street Bank & Trust Co. v. Signature Fin. Group*, *supra*.

As to claims 1-5, the examiner alleges that claims 1-5 are directed to a method that describes various steps of a computer program and that such program by itself is an abstract algorithm. The examiner cited *In re Warmerdam*, 31 USPQ2d 1754 (Fed. Cir., 1994), in support of the conclusion. Appellants cited *In re Lowry*, 32 F. 3d 1579, 32 USPQ2d 1031 (Fed. Cir. 1994), which held that data structures can constitute patentable subject matter. In response the

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Examiner argued that the definition of attribute data object (which was held to constitute patentable subject matter in *Lowry*) "describes the data objects as being comprised of [*sic*: comprise] electrical or signals [*sic*: electrical signals]. Signals are a form of energy and transformation of signals is not a physical transformation of objects." Final Office Action at page 10. In other words, by arguing that the definition used by the Court of Appeals is not directed to statutory subject matter, the Examiner is in effect arguing that *Lowry* was improperly decided by the Federal Circuit. The USPTO Board of Appeals cannot overrule the Court of Appeals for the Federal Circuit and in fact is bound by the Federal Circuit's precedent.

Moreover, the Examiner's insistence on a requirement of a physical transformation is in error. The Federal Circuit has said: "The notion of 'physical transformation' can be misunderstood. In the first place, it is not an invariable requirement, but merely one example of how a mathematical algorithm may bring about a useful application. As the Supreme Court itself noted, 'when [a claimed invention] is performing a function which the patent laws were designed to protect (e.g., transforming or reducing an article to a different state or thing), then the claim satisfies the requirements of 101.' *Diehr*, 450 U.S. at 192 (emphasis added)." The "e.g." signal denotes an example, not an exclusive requirement." *AT&T Corp. v. Excel Communications Inc.*, 50 USPQ2d 1447 (Fed. Cir. 1999).

The Office Action argued that claims 1-5 relate to data in a computer memory. The Office Action further argued that "[t]hese signals represent a form of energy, and transforming such energy cannot be called a physical transformation." Finally, the Office Action argued that the claims do not produce a "useful, concrete and tangible result" or any "tangible real-world result." Appellants disagree. The claimed invention relates to a computer system that transforms

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a computer program so that it runs more quickly. See specification paragraph [0003]. That is a tangible real world result.

As to claims 6-10 the Office Action contends that these claims are directed to a computer readable medium and that these claims could be viewed as producing a tangible result if limited to a tangible medium. In 1994 the Federal Circuit responded to Appellant's appeal in *In re Beauregard*, 53 F.3d 1583 (Fed. Cir. 1995), by dismissing the appeal and remanding the case to the PTO with the following: "the Commissioner now states that computer programs embodied in a tangible medium such as floppy diskettes are patent subject matter under 35 U.S.C. § 101." The Examiner's reason for this rejection is a statement in the specification of the instant application: "a computer medium may include, for example, volatile storage such as RAM, buffers, cache memory, and network circuits. Furthermore, the computer readable medium may include computer readable information in a transitory state medium such as a network link and/or a network interface, including a wired network or a wireless network, that allow a computer to read such computer readable information." See specification at page 14. The Examiner took the above part of the specification as defining a computer readable medium as possibly including a signal and stated: "Electronic signals represent a form of energy and are not tangible." Appellants contend that this is an error and request reversal.

It is firmly established that signals are patentable subject matter. *O'Reilly v. Morse*, 56 U.S. (15 How.) 62, 111 (1853). In *Arrhythmia Research Technology, Inc. v. Corazonix Corp.*, 22 USPQ2d 1033 (Fed. Cir. 1992), the Federal Circuit held that electrical signals are physical and said:

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"These claimed steps of "converting", "applying", "determining", and "comparing" are physical process steps that transform one physical, electrical signal into another. The view that "there is nothing necessarily physical about 'signals' is incorrect."

In *In re Taner*, 681 F.2d 787 (C.C.P.A. 1982), the predecessor court to the Federal Circuit held that claims relating to a method of seismic exploration by which substantially plane or substantially cylindrical seismic energy waves were simulated from substantially spherical seismic waves set forth a patentable invention. 681 F.2d at 789-90. The Board of Appeals in *Taner* took the position that "there is nothing necessarily physical about 'signals.'" The Federal Circuit held that the Board's characterization was "contrary to the views expressed by [the Federal Circuit] in *In re Sherwood*, 613 F.2d 809 (CCPA 1980), and *In re Johnson*, 589 F.2d 1070, where signals were viewed as physical and the processes were viewed as transforming them to a different state." 681 F.2d at 790.

(b) Definiteness of Claims.

The final Office Action rejected claims 2 and 7 under the second paragraph of 35 USC §112 as lacking antecedent for "the determining of an initial property." Appellants are filing a rejection after final rejection attempting to correct this lack of antecedent.

(c) Anticipation

Clawson does not anticipate claim 1. The test for anticipation is—whether the claims read upon a product or process described in the prior art. *SSIH Equipment S.A. v. USITC*, 718 F.2d 365, 218 USPQ 678 (Fed. Cir. 1983). Anticipation must be found in a single reference. *Studiengesellschaft Kohle, m.b.H. v. Dart Indus., Inc.*, 726 F.2d 724, 220 USPQ 841 (Fed. Cir. 1984). Anticipation requires the presence in a single prior art disclosure of all elements of a

claimed invention arranged as in the claim. *Soundscriber Corp. v. U.S.*, 360 F.2d 954, 960, 148 USPQ 298 , 301 [175 Ct. Cl. 644] (1966). A prior art disclosure that "almost" meets that standard may render the claim invalid under § 103; it does not "anticipate." *Jamesbury Corp. v. Litton Industrial Products, Inc.* 756 F.2d 1556 (Fed. Cir. 1985). To anticipate a claim, a reference must disclose every element of the challenged claim and enable one skilled in the art to make the anticipating subject matter. *Chester v. Miller*, 906 F.2d 1574, 1576 n.2, 15 USPQ2d 1333, 1336 n.2 (Fed. Cir. 1990); *In re Donohue*, 766 F.2d 531, 533, 226 USPQ 619, 621 (Fed. Cir. 1985). *Clawson* does not disclose all of the elements of any of the claims.

Clawson

Clawson relates to a method for utilizing computer system resources according to a computing architecture. The *Clawson* method begins by obtaining an operational environment for denizen processes. The operational environment includes at least the two locations and also includes a way for denizens to travel between the locations. The *Clawson* method then provides at least one user denizen which is capable of receiving instructions, evaluating different locations in the operational environment in view of the received instructions, selecting a location based on that evaluation, moving itself to the selected location, and executing at least a portion of the received instructions at the selected location. The *Clawson* specification uses a bizarre set of ocean creature metaphors that leave much room for speculation.

Claim 1:

Clawson does not disclose "instrumenting said at least partial run of said program to determine characterization information about each of said objects." The Examiner considers the

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"denizens" of *Clawson* to correspond to objects and cites col. 7, lines 29-41 of *Clawson* in support of the contention that *Clawson* discloses this claimed step. That part of *Clawson* reads:

"The internal structure of one embodiment of a denizen process 100 is illustrated in FIG. 2, with continued reference to FIG. 1. Each denizen 100 includes at least a configuration portion 202, an origin portion 204, and an executable portion 206. A section of the configuration portion 202 contains routing information 208 which reflects the paths 106 traveled by the denizen 100 to its current location 104 and/or known or possible paths 106 to other locations 104 in the operational environment 102. The configuration portion 202 may also contain a pod identifier 210 which identifies one or more "pods" to which the denizen 100 belongs; pods are discussed in detail below. In addition, the configuration portion 202 may contain an ocean identifier 212 which distinguishes the currently surrounding operational environment 102 from other operational environments. The configuration portion 202 may also contain execution state information 214, such as Java virtual machine flags."

The term "instrumentation" is defined as "what is required to measure a complex activity, such as the performance level of a computer system, whether hardware or software." *Dictionary of Computers, Information Processing & Telecommunications, Second Edition*, John Wiley & Sons (1984, 1987). According to Appellant's application an object is "characterized" by determining its alternative properties. See Specification at page 3, lines 1-2. The term "property" is defined in the specification as including "location," "parameter," and "implementations." *Clawson* does not disclose instrumentation to determine such properties. The Examiner contends that *Clawson* discloses "an alternative property" by disclosing a location and "characterization information" as a "configuration portion." However, no instrumentation is disclosed. Moreover, if "location" were a property there is no plurality of alternative property properties.

Clawson does not disclose the claimed step of "determining a desirable property for said objects." The Examiner cites *Clawson* at col. 4, lines 28-34 and col. 11, lines 40-47. These parts are reproduced below:

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“The operational environment includes at least the two locations and also includes a way for denizens to travel between the locations. The method then provides at least one user denizen which is capable of receiving instructions, evaluating different locations in the operational environment in view of the received instructions, selecting a location based on that evaluation, moving itself to the selected location, and executing at least a portion of the received instructions at the selected location.”

“Suitable resource information includes CPU type and speed, memory characteristics, hard drive availability, system histories, swap space, and other computing resource characteristics. If the resources needed to execute a given set of instructions are not available within the denizen's native ocean 102, then the querying step 304 may involve contacting resource denizens in other oceans in an attempt to locate the resources the denizen 100 needs.”

However, there is no disclosure of alternative properties to select from. The examiner contends that the property is location but location is not even mentioned in the quoted sections above.

Clawson also fails to disclose the step of “determining a correlation between said desirable property and said characterization information for each of said objects.” The Examiner cited *Clawson* at col. 11, lines 48-54 in support:

“During a selecting step 306, the denizen 100 selects a location 104 based on the results of the steps 302, 304. Information considered may include not only the resources at the current location but also a history of attempts made at various locations 104 and other information needed to determine which location 104 is best for executing the received instructions.”

Step 302 is analyzing instructions and step 304 is query resource denizens. There is no correlation disclosed.

Clawson does not disclose the claimed step “using said correlation to select a property for an object subsequently created ...” Since there is no correlation performed in *Clawson* there is no use of the correlation.

Claim 2:

Clawson does not disclose the limitation of claim 2 "wherein the determining of an initial property in step (b) is carried out by minimizing total cost of interaction among components during at least a partial run of said program." The Examiner cited the following:

"In summary, the present invention provides a distributed computing architecture including processes that move between various platforms at different locations to optimize performance, detect and attempt to correct internal defects in their own structure, and modify themselves in response to the results of queries or other input."

First, as established above, there is no disclosure of a step (b) as claimed. Second, the Examiner said: "Such optimization implies a minimization of total cost of interaction as it results in performing fewer computational operations." Optimization is not the same as minimization. The Examiner draws an inference on the teachings of *Clawson* that fails to establish anticipation.

Claim 3:

Clawson does not disclose the limitation of claim 3 "wherein said characterization information of an object comprises at least one of said object's class, classification of said object's creator object, and a code identification of said object's creation site." The Examiner identified "location" as the alleged property. See Final Office Action at page 5. In rejecting this claim the Examiner cited:

"The configuration portion 202 may also contain a pod identifier 210 which identifies one or more "pods" to which the denizen 100 belongs; pods are discussed in detail below. In addition, the configuration portion 202 may contain an ocean identifier 212 which distinguishes the currently surrounding operational environment 102 from other operational environments. The configuration portion 202 may also contain execution state information 214, such as Java virtual machine flags."

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The above section does not discuss an object's (allegedly denizen's) class, classification of the object's creator, or its creation site.

Claim 4:

Clawson does not disclose the limitation of claim 4 wherein "said alternative properties comprise a string representation selected from ASCII, EBCDIC, and UNICODE." The

Examiner cites:

"The ODE 100 assumes that the text chunk is in ASCII format, and displays it to the user as the following new message: "Har han haft ferie?" The user, who speaks only English, does not recognize the phrase or the language that the phrase is in. The user selects the message and presses the "Translate" button."

Claim 4 requires that the alternative properties include a string representation. The above-quoted language does not discuss an alternative property of an object. The paragraph preceding the quoted language (reproduced below) makes it clear that the ASCII format is that of a message, not the alleged object (ODE):

"Assume an ODE 100 receives the following text in binary format to be translated:

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010010000110000101110001000100000110100001100001011011100010000001101000  
011000010110011001110100001000000110011001100101011100100110100101100101  
00111111"
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Claims 6-10.

Claims 6-10 are program product (manufacture) claims. Claim 6 is a counterpart of claim 1 and is patentable for at least the same reasons as claim 1. Claim 7 is a manufacture counterpart to claim 2 and is patentable for at least the same reasons as claim 2. Claim 8 is a manufacture counterpart to claim 3 and is patentable for at least the same reasons as claim 3. Claim 9 is a manufacture counterpart to claim 4 and is patentable for at least the same reasons as

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claim 4. Claim 10 is a manufacture counterpart to claim 5 and is patentable for at least the same reasons as claim 5.

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Respectfully submitted,

Date: November 6, 2006

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Appendix of Claims

1. A method of characterizing objects generated during at least a partial run of a program, each object being characterized by a plurality of alternative properties which can be selected, said method comprising:

- a) instrumenting said at least partial run of said program to determine characterization information about each of said objects;
- b) determining a desirable property for said objects;
- c) determining a desirable one of said potential alternative properties and said characterization information for each of said objects;
- c) determining a correlation between said desirable property and said characterization information for each of said objects;
- d) using said correlation to select among the alternative properties for an object subsequently created during an at least partial run of said program based upon characterization information about the subsequently created object.

2. The method as set forth in claim 1, wherein the determining of an initial property in step (b) is carried out by minimizing total cost of interaction among components during at least a partial run of said program.

3. The method as set forth in claim 1, wherein said characterization information of an object comprises at least one of said object's class, classification of said object's creator object, and a

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code identification of said object's creation site.

4. The method as set forth in claim 1, wherein said alternative properties comprise a string representation selected from ASCII, EBCDIC, and UNICODE.
5. The method as set forth in claim 1, wherein said alternative properties comprise a data structure selected from hash table, tree, and compressed data structures.
6. A computer readable medium including computer instructions executable on a computer for carrying out a method of characterizing objects generated during at least a partial run of a program, each object comprising a plurality of potential alternative properties said method comprising:
 - a) instrumenting said at least partial run of said program to determine characterization information about each of said objects;
 - b) determining a desirable property for each of said objects;
 - c) determining a desirable one of said potential alternative properties for said objects;
 - d) using said correlation to select among the alternative properties for an object subsequently created during an at least partial run of said program based upon characterization information about the subsequently created object.
7. The computer readable medium as set forth in claim 6, wherein the determining of an initial property in step (b) is carried out by minimizing total cost of interaction among components

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during at least a partial run of said program.

8. The computer readable medium as set forth in claim 6, wherein said characterization information of an object comprises at least one of said object's class, classification of said object's creator object, and a code identification of said object's creation site.

9. The computer readable medium as set forth in claim 6, wherein said alternative properties comprise a string representation selected from ASCII, EBCDIC, and UNICODE.

10. The computer readable medium as set forth in claim 6, wherein said alternative properties comprise a data structure selected from hash table, tree, and compressed data structures.

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Attorney's Docket No.: YOR920020050US1

Evidence Appendix.

N/A